by from 3° to 15°, and that it has missed the minimum on different days by 5°, 8°, 13°, 19°, and 27°.

Improper exposure of thermometers will account for a part of this discrepancy; and it is well known that the chief signal-officer has already recognized the importance of this point, circulars having been distributed, some months ago, to all volunteer observers, requesting detailed information concerning the manner and method of exposure. The location of the station appears to the writer to be of even greater importance. It is unfortunate that nearly all stations of the U. S. signal-service are in large cities, and often in the most densely built and populated portion of them. Concerning temperature, at least, it is not likely that such situations will give results of great value, even with the most careful attention to exposure.

From geographical and topographical considerations, the station at Columbus is more likely to fairly represent the state of Ohio than either of the others; but the above observations show that it may fall far short of doing it. Observations taken at Cincinnati represent little more than the conditions in that city, the topography of that region being such that the city might almost be said to have a climate of its own. One of the State-service stations is at Waverly, the latitude of which is very nearly the same as that of Cincinnati. On the 21st, Waverly reported a minimum of −14°, and Cincinnati, of +7.9°; and on the 25th, Waverly reported −27.2°, and Cincinnati, +3.7°. In Cleveland and Toledo the climate is modified greatly by the presence of Lake Erie. At Wauseon, thirty miles from Toledo, the minimum is reported on the 25th as −31.7°; and at Toledo it was −9°.

There are, doubtless, excellent reasons why these stations should be where they are, and also why it is generally desirable to locate stations in large cities; but there seems to be little doubt that for temperature measurements it would be well to put stations *near* rather than *in* large cities, and at sufficient distance from them to be free from purely local conditions.

The importance of the maintenance of state weather-services is not so generally appreciated as it deserves to be. It is impossible for the U. S. service, at least at present, to increase the number of its stations to the extent that would seem desirable and necessary in order to obtain the details of climatic conditions. The organization of state services is generously encouraged by the chief signal-officer; and if they become general, and are efficient, they may be of great service to the very competent corps of government meteorologists in their investigation of general problems in climatology.

T. C. MENDENHALL.

IRON FROM NORTH CAROLINA MOUNDS.

IN the Proceedings of the American antiquarian society, vol. ii. p. 349 (1883), Professor Putnam reviews the statements of the old writers respecting metal found in the western mounds. He comes to the conclusion that Mr. Atwater's iron-bladed sword or steel-bladed dagger is to be traced to that gentleman's lively imagination.

Although Professor Putnam may be correct in his conclusion, a discovery made in North Carolina by one of the assistants in the Bureau of ethnology, during the past season, would seem to render the statement made by Atwater in regard to finding the fragment of an iron sword-blade in an Ohio mound at least probable.

In order that the reader may understand the conditions under which the articles to be mentioned were found, it is necessary to give a description of the burial-place, which I do by copying the report of the assistant.

"This is not a mound, but a burial-pit, in the form of a triangle, the two longest sides each forty-eight feet, and the base, thirty-two feet, in which the bodies and articles were deposited, and then covered over, but not raised above the natural surface. The depth of the original excavation, the lines of which could be distinctly traced, varied from two and a half to three feet. A rude sketch of this triangle, showing the relative positions of the skeletons, is given in fig. 1.

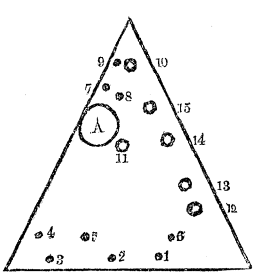

FIG. 1.

"Skeletons Nos. 1, 2, 3, 4, 5, 6, 7, 8, and 9 were lying horizontally on their backs, heads east and north-east. By No. 2 was a broken soapstone pipe; by No. 5 and also by No. 9, a small stone hatchet.

"Nos. 10, 11, 12, 13, 14, and 15 were buried in rude stone vaults built of cobblestones similar to those in fig. 2, which represents the arrangement of the bodies and vaults in a mound near by. (This mound was over a circular pit.) Nos. 10, 12, 13, and 15 were in a sitting-posture, and without any accom-

panying articles. Graves Nos. 11 and 14 contained each two bodies extended horizontally,—the lower ones, which were of smaller stature than the upper ones, face up, and with heavy flat stones on the extended arms and legs; the upper ones with the face down; no implements or ornaments with them.

inscribed shells were found. Scattered over and among these ten or more skeletons were found hatchets (polished axes and celts), rubbing and discoidal stones, copper arrow-points, mica, paint, black lead, etc."

This is sufficient to indicate the conditions under which the iron specimens were found.

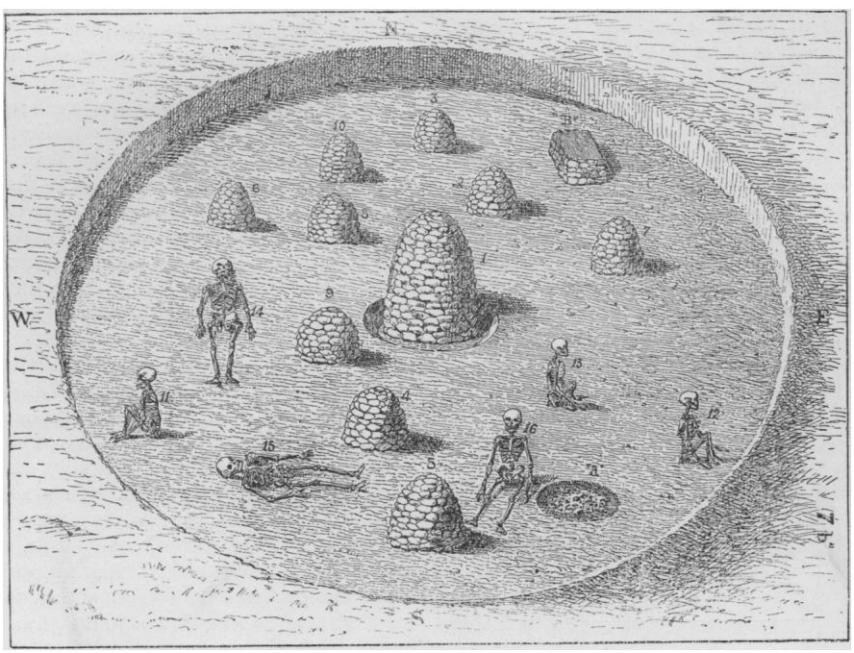

FIG. 2.

"On the north-west side of the triangle, at *A*, fig. 1, ten or more bodies were found which appeared to have been buried at one time; the old chief (?) with his head north-east, face down. Under his head was the larger sea-shell with hieroglyphics. Around his neck were the largest-sized beads. At or near each ear were the larger pieces of copper: there was also a piece of copper under his breast. His arms were extended, and his hands rested about one foot from each side of his head. Around each wrist was a bracelet composed of long, cylindrical, copper beads and shell beads alternated. *At his right hand were found the implements of iron.* Under his left hand was a sea-shell with hieroglyphics inscribed on the concave surface, and filled with beads of all sizes.

"Around and over him, with their heads resting near his, were placed nine or more bodies. Under the heads of two of these skeletons, resting within a foot of the chief's (?), similarly

It is proper to state that every article named was immediately forwarded to the bureau, and is now in the National museum. The celts and axes, which are chiefly of greenish sienite, are highly polished, and equal in finish to the finest hitherto discovered in this country. The pipes are well made, and mostly well polished. The engraved shells are fine, large specimens, the engraved design on each being of the same type as that shown in fig. 3, plate xxx., of Jones's Antiquities of the southern Indians.

The iron specimens alluded to are now before me, and are four in number, much corroded, but still showing the form. Two of them are flat pieces, of uniform thickness, not sharpened at the ends or edges, three to three and a half inches long, one to one and a half inches broad, and about a quarter of an inch thick. Another is five inches long, slightly tapering in width from one and an eighth to seven-eighths of an inch, both edges sharp, and is, without doubt, part of the blade of a long, slender, cutting or

thrusting weapon of some kind; as a sword, dagger, or large knife. The other specimen is part of some round, awl-shaped implement; and a small fragment of the bone handle in which it was fixed yet remains attached to it.

The bureau is also in possession of another rudely hammered, small iron chisel or celt, found under somewhat similar conditions in a mound in the same section.

It is evident, from what has been stated, that we cannot ascribe the presence of this metal to an intrusive burial. The people who dug the pit, deposited here their deceased chief, or man of authority, and placed around him, and those buried with him, the pipes, celts, axes, engraved shell-gorgets, and other implements and ornaments, undoubtedly placed here, also, the pieces of iron.

Whether the burials were comparatively modern or pre-Columbian, the evidence furnished by these fortunate finds compels us to conclude that the people who made these polished celts and axes, who carved these pipes, who made or at least used these copper implements, and engraved these shells with the figure of the mystic serpent, so strongly reminding us of Central-American figures, also had in possession these iron implements, and were mound-builders. That this burial-pit was made by the same people who erected the mounds of this region cannot be doubted.

Cyrus Thomas.

PENNSYLVANIA ANTHRACITE.

Some of the commonest articles used, either for manufacturing purposes or in the household, are frequently those about which we have the least definite information as to their composition or value. Near the point of production or manufacture, the consumer is apt to exhibit the most discriminating judgment in the selection of special brands or grades, on account of closer competition and a greater variety from which to make a selection. This is frequently done on the basis of a personal estimate, without substantial facts to warrant it. To no natural product does this apply with greater force, at the present time, than to the Pennsylvania anthracites, which are now depended upon by manufacturers and housekeepers, either as a necessary or luxuriant fuel, throughout portions of the entire western continent, and are used at points as distant as China and Japan.

Both the manufacturing and domestic consumers are beginning to realize the fact that their coal purchased this year does not seem to burn so freely, does not fire with so little trouble, and does not last so long, as that purchased during the last and previous years, or *vice versa*. Where coals of different sizes, or from different districts, are offered to the trade by the same or competing salesmen, the question suggests itself, what shall we buy?

Among housekeepers, who are the smallest and most numerous class of consumers, distinction is seldom recognized between these anthracites. By other consumers the coals are grouped into those, which, when burned, will produce either a white or a red ash, special qualities being arbitrarily attached to each. Others, again, know only of three varieties: 1°, those from the Wyoming and Lackawanna fields, or the coals shipped from the northernmost basins over the railroads running through north-eastern Pennsylvania direct to New York (notably, the Delaware, Lackawanna, and Western, Delaware and Hudson, and Erie railways); 2°, those shipped by the Lehigh valley railroad, and the Central railroad of New Jersey, down the Lehigh valley; and, 3°, those over the Philadelphia and Reading railroad down the Schuylkill valley. Still other distinctions are arbitrarily made, which it is not necessary to note. In special localities, where a favorite coal is largely used, the consumer will speak of one class, that composed of his favorite coal, which possibly comes from two or three collieries, with a total aggregate annual production of less than a million tons; and of a second class, that composed of the coals from all other collieries, represented by an annual production of over thirty million tons. I have noticed this particularly in sections of New England, where even an intelligent consumer will sometimes speak of Lykens valley coal and of all other Pennsylvania anthracites.

The pressing demand which has been made upon the Geological survey of Pennsylvania, for some answer as to the fuel-value of different coals, has led me to consider what is the composition of Pennsylvania anthracite, as a preliminary step in the investigation.

Various percentages of fixed carbon have been assigned by different authorities to a typical anthracite. That which has been most generally accepted has been about 94, with all the accidental impurities, such as those which are generally classified under ash and sulphur, eliminated. Professor Rogers (Final report of first survey, vol. ii. pp. 969, 970) gives analyses of fifteen specimens of hard, dry Pennsylvania anthracite, which show an average, of fixed carbon, 88.05; of volatile matter, 5.81; of